

Appl. No. 10/674,669  
Atty. Docket No. 8598MRL  
Amdt. dated May 15, 2006  
Reply to Office Action of February 15, 2006  
Customer No. 27752

## **REMARKS**

### **Claim Status**

Claims 1 and 9 have been amended. Claim 15 has been added. Claims 1-15 are now pending. Applicant reserves the right to pursue the original claims in this and other applications. The Title of the Invention has been amended to correspond more closely to the pending claims. Applicant respectfully requests reconsideration of the above-referenced application in light of the amendments and following remarks.

### **Claim Amendment and Addition Support**

Independent claim 1 has been amended to recite a halogen dioxide generating system comprising, *inter alia*, "a) a source . . . b) a non-membrane electrolysis cell comprising an anode and a cathode, and having a cell chamber with an inlet and an outlet; c) a passage comprising the aqueous feed solution adjacent to the anode of said non-membrane electrolysis cell; and d) an electric current supply that provides an electrical current of less than about 1.0 watts between said anode and said cathode." Support for the claim amendment is found in Applicant's specification, at least on p. 8, l. 31 – p. 15, l. 26.

Independent claim 9 has been amended to recite a halogen dioxide generating and re-circulating system comprising, *inter alia*, "a) a source . . . b) a non-membrane electrolysis cell comprising an anode and a cathode, said anode and said cathode being separated by a non-conducting porous flow, and having a cell chamber with an inlet and an outlet; c) a passage with an inlet and outlet for the chamber formed through at least a portion of said non-conducting porous flow barrier . . . d) an electric current supply; and e) a return passage for returning reverted halogen dioxide salt back to said source." Support for the claim amendment is found in Applicant's specification, at least on p. 8, l. 31 – p. 15, l. 26.

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New independent claim 15 has been added. Claim 15 recites an electrolysis device comprising, *inter alia*, "at least one cell chamber; at least one electrolytic cell with at least one anode and at least one cathode, wherein at least one pair of an anode and a cathode is separated by a porous barrier; a reservoir connected to said at least one electrolytic cell by a passage; at least one pump connected to said reservoir and passage; and at least one battery connected to said at least one anode and said at least one cathode." Support for the claim amendment is found in Applicant's specification, at least on p. 8, l. 31 – p. 15, l. 26.

Rejection Under 35 U.S.C. § 102(b)

Claim 1 stands rejected to under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,306,281 ("Kelley"). The rejection is respectfully traversed.

Applicant respectfully directs the Examiner's attention to the "Amendments" section of the instant paper, in which Applicant has amended independent claim 1, to particularly point out and distinctly claim the subject matter that the Applicant regards as his invention. Support for the present amendment is found throughout the specification and claims, as originally-filed. No new matter has been introduced.

As such, Applicant respectfully submits that Kelley does *not* disclose a halogen dioxide generating system comprising, *inter alia*, "a) a source . . . b) a non-membrane electrolysis cell comprising an anode and a cathode, and having a cell chamber with an inlet and an outlet; c) a passage comprising the aqueous feed solution adjacent to the anode of said non-membrane electrolysis cell; and d) an electric current supply that provides *an electrical current of less than about 1.0 watts* between said anode and said cathode," as recited in claim 1 (emphasis added).

Kelley requires the addition of a buffering agent and/or an acid to the aqueous chlorite solution in an amount sufficient to control the pH of the chlorine dioxide solution at a pH of about 9.5 or below upon electrolysis. *See* Kelley; Claim 1. Due to the high concentration of buffer required for stabilization according to Kelley, it is believed that Kelley's process and system *requires higher power requirements*; and thus, is not suitable

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for battery performance (*i.e.*, 6 Volts, 5 Amps, in a DC System). In contrast, Applicant's claimed system may be configured for operation via a battery or set of batteries – including those having a nominal voltage potential of 1.5 volts, 3 volts, 4.5 volts and 6 volts (Applicant's specification, p. 17).

In other words, Kelley does *not* disclose “an electric current supply that provides *an electrical current of less than about 1.0 watts* between said anode and said cathode,” as recited in claim 1 (emphasis added). For at least these reasons, Kelley does not teach the subject matter of amended claim 1, and therefore, the § 102(b) rejection of claim 1 should be withdrawn.

Rejection Under 35 U.S.C. § 103(a)

Claim 2 stands rejected to under 35 U.S.C. § 103(a) as being unpatentable over Kelley in view of U.S. Patent No. 4,414,070 (“Spence”). The rejection is respectfully traversed.

Claim 2 depends from claim 1, and for at least the reasons provided above with regard to claim 1, Kelley does not disclose, much less suggest the subject matter of independent claim 1. Specifically, Kelley does *not* disclose or suggest a halogen dioxide generating system comprising, *inter alia*, “an electric current supply that provides *an electrical current of less than about 1.0 watts* between said anode and said cathode,” as recited in claim 1 (emphasis added). As indicated above, it is believed that Kelley's process and system *requires higher power* requirements.

Spence is relied upon for disclosing that the efficiency of electrolytic cells is dependent on the anode-cathode distance, and adds nothing to rectify the deficiencies associated with Kelley. The Office Action asserts it would have been obvious to routinely optimize the gap between the anode and cathode to achieve a minimized spacing such as 0.5 mm to improve cell efficiency. Applicant respectfully disagrees. There is no motivation to combine the cited references.

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To accommodate the buffer concentration of the aqueous solution disclosed by Kelley (*i.e.*, 10,000 parts per million), it is believed that a *large cell chamber gap size* would be required rather than a smaller one. The present invention relates to electrolysis cells having a cell chamber gap size of 0.5 millimeters, more preferably 0.2 millimeters, or less (Applicant's specification, p. 9, ll. 10-11). The only motivation to combine the references is gleaned from Applicant's specification.

As such, Kelley and Spence, even if properly combinable which they are not, still would not teach or suggest that "the anode and the cathode *are confronting and co-extensive, with a chamber gap of 0.5 mm or less,*" as recited in dependent claim 2. These are additional reasons for the allowance of claim 2. Consequently, the § 103(a) rejection of claim 2 should be withdrawn.

#### Rejection Under 35 U.S.C. § 103(a)

Claims 3-5 stands rejected to under 35 U.S.C. § 103(a) as being unpatentable over Kelley in view of U.S. Patent No. 5,106,465 ("Kaczur"). The rejection is respectfully traversed.

Claim 3-5 depend from claim 1, and for at least the reasons provided above with regard to claim 1, should be similarly allowable with claim 1. Specifically, Kelley does *not* disclose or suggest a halogen dioxide generating system comprising, *inter alia*, "an electric current supply that provides *an electrical current of less than about 1.0 watts* between said anode and said cathode," as recited in claim 1 (emphasis added). As indicated above, it is believed that Kelley's process and system *requires higher power* requirements. Kaczur is relied upon for disclosing a porous platinum coated titanium anode, and adds nothing to rectify the deficiencies associated with Kelley. Consequently, the § 103(a) rejection of claims 3-5 should be withdrawn.

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Rejection Under 35 U.S.C. § 103(a)

Claim 6 stands rejected to under 35 U.S.C. § 103(a) as being unpatentable over Kelley in view of Kaczur, and further in view of DE 100 17 407 ("DE '407"). The rejection is respectfully traversed.

Claim 6 depends from claim 1, and for at least the reasons provided above with regard to claim 1, Kelley does not disclose, much less suggest the subject matter of independent claim 1. Specifically, Kelley does *not* disclose or suggest a halogen dioxide generating system comprising, *inter alia*, "an electric current supply that provides *an electrical current of less than about 1.0 watts* between said anode and said cathode," as recited in claim 1 (emphasis added). As indicated above, it is believed that Kelley's process and system *requires higher power* requirements.

DE '407 is relied upon for a continuous water treatment, and adds nothing to rectify the deficiencies associated with Kelley and Kaczur. The Office Action asserts it would have been obvious to incorporate the DE '407's water treatment apparatus since it would provide simple handling, safe production, and *reduced costs* (Office Action, p. 6). Applicant respectfully disagrees. The water treatment apparatus would *increase* costs and *increase* the complexity of Kelley's apparatus. As such, there is no motivation to combine the references. The only motivation to combine is gleaned from Applicant's specification. These are additional reasons for the allowance of claim 6. Consequently, the § 103(a) rejection of claim 6 should be withdrawn.

Rejection Under 35 U.S.C. § 103(a)

Claims 9-14 stand rejected to under 35 U.S.C. § 103(a) as being unpatentable over Kelley in view of U.S. Patent No. 5,965,004 ("Cowley"), and further in view of DE '407. The rejection is respectfully traversed.

Applicant respectfully directs the Examiner's attention to the "Amendments" section of the instant paper, in which Applicant has amended independent claim 9, to particularly point out and distinctly claim the subject matter that the Applicant regards as

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his invention. Support for the present amendment is found throughout the specification and claims, as originally-filed. No new matter has been introduced.

As such, Applicant respectfully submits that Kelley does *not* disclose or suggest a halogen dioxide generating system comprising, *inter alia*, “a) a source . . . b) a non-membrane electrolysis cell comprising an anode and a cathode, *said anode and said cathode being separated by a non-conducting porous flow barrier*, and having a cell chamber with an inlet and an outlet; c) a passage with an inlet and outlet for the chamber formed through at least a portion of said non-conducting porous flow barrier . . . d) an electric current supply; and e) a return passage for returning reverted halogen dioxide salt back to said source,” as recited in claim 9 (emphasis added).

Kelley does not disclose or suggest a non-conducting porous flow barrier separating the anode and cathode. Claims 10-14 depend from claim 9 and should be similarly allowable with claim 9 for at least the reasons provided above with regard to claim 9, and on their own merits.

Provisional Rejection Under 35 U.S.C. § 101

Claims 1-3 and 9 stand provisionally rejected under 35 U.S.C. § 101 as claiming the same invention as co-pending application no. 09/947,846 (“the ‘846 application”). The provisional rejection is respectfully traversed.

Independent claims 1 and 9 have been amended. As a result, Applicant believes that the subject matter between the present application and the ‘846 application is patentably distinct and *not* coextensive in scope. For example, the ‘846 application claims do *not* recite a halogen dioxide generating system comprising, *inter alia*, “a) a source . . . b) a non-membrane electrolysis cell comprising an anode and a cathode, and having a cell chamber with an inlet and an outlet; c) a passage comprising the aqueous feed solution adjacent to the anode of said non-membrane electrolysis cell; and d) *an electric current supply that provides an electrical current of less than about 1.0 watts between said anode and said cathode*,” as recited in claim 1 (emphasis added).

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Similarly, '846 application claims do *not* recite a halogen dioxide generating and re-circulating system comprising, *inter alia*, "a) a source . . . b) a non-membrane electrolysis cell comprising an anode and a cathode, *said anode and said cathode being separated by a non-conducting porous flow*, and having a cell chamber with an inlet and an outlet; c) a passage with an inlet and outlet for the chamber formed through at least a portion of said non-conducting porous flow barrier . . . d) an electric current supply; and e) a return passage for returning reverted halogen dioxide salt back to said source," as recited in claim 9 (emphasis added). As a result, the provisional § 101 rejection of claims 1-3 and 9 should be withdrawn.

Provisional Rejection Under the Doctrine of Non-Statutory Obviousness-Type  
Double-Patenting Over the '667 Application

Claims 1-5 stand provisionally rejected under the judicially-created doctrine of obviousness-type double patenting as being unpatentable over the claims of copending Application No. 10/027,667 ("the '667 application"). The provisional rejection is respectfully traversed.

Applicant notes that independent claim 1 has been amended. As such, Applicant believes that the subject matter between the present application and the '667 application is patentably distinct. For example, the '667 application claims do *not* recite a halogen dioxide generating system comprising, *inter alia*, "a) a source . . . b) a non-membrane electrolysis cell comprising an anode and a cathode, and having a cell chamber with an inlet and an outlet; c) a passage comprising the aqueous feed solution adjacent to the anode of said non-membrane electrolysis cell; and d) an electric current supply that provides an electrical current of less than about 1.0 watts between said anode and said cathode." As a result, the provisional obviousness-type double patenting rejection should be withdrawn.

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Provisional Rejection Under the Doctrine of Non-Statutory Obviousness-Type  
Double-Patenting Over the '667 Application

Claims 6-8 and 12-14 stand provisionally rejected under the judicially-created doctrine of obviousness-type double patenting as being unpatentable over the claims of copending the '667 application in view DE '407. The provisional rejection is respectfully traversed.

Claims 6-8 depend from amended independent claim 1. As such, Applicant believes that the subject matter between the present application and the '667 application is patentably distinct. For example, the '667 application claims do *not* recite a halogen dioxide generating system comprising, *inter alia*, "a) a source . . . b) a non-membrane electrolysis cell comprising an anode and a cathode, and having a cell chamber with an inlet and an outlet; c) a passage comprising the aqueous feed solution adjacent to the anode of said non-membrane electrolysis cell; and d) *an electric current supply that provides an electrical current of less than about 1.0 watts between said anode and said cathode,*" as recited in claim 1 (emphasis added). DE '407 is relied upon for a continuous water treatment, and adds nothing to rectify the deficiencies associated with the '667 application. As a result, the provisional obviousness-type double patenting rejection should be withdrawn for at least claims 6-8.

Moreover, independent claim 9 has been amended. As such, Applicant believes that the subject matter between the present application and the '667 application is patentably distinct. For example, the '667 application claims do *not* recite a halogen dioxide generating and re-circulating system comprising, *inter alia*, "a) a source . . . b) a non-membrane electrolysis cell comprising an anode and a cathode, *said anode and said cathode being separated by a non-conducting porous flow*, and having a cell chamber with an inlet and an outlet; c) a passage with an inlet and outlet for the chamber formed through at least a portion of said non-conducting porous flow barrier . . . d) an electric current supply; and e) a return passage for returning reverted halogen dioxide salt back to said source," as recited in claim 9 (emphasis added). Claims 12-14 depend from amended independent claim 9. DE '407 is relied upon for a continuous water treatment,

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and adds nothing to rectify the deficiencies associated with the '667 application. As a result, the provisional obviousness-type double patenting rejection should be withdrawn for at least claims 12-14.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to review and pass this application to issue.

Respectfully submitted,

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